

REMARKS

Applicants respectfully request reconsideration of the present application in view of the reasons that follow. Claims 1-25 were previously canceled, and Claims 26-53 were added. Claims 26-53 are pending in this application.

I. Finality of Office Action

In section 3 of the Final Office Action, the Examiner stated:

All claims are drawn to the same invention claimed in the application prior to the entry of the submission under 37 CFR 1.114 and could have been finally rejected on the grounds and art of record in the next Office action if they had been entered in the application prior to entry under 37 CFR 1.114. Accordingly, **THIS ACTION IS MADE FINAL** even though it is a first action after the filing of a request for continued examination and the submission under 37 CFR 1.114.

(Bolding in original). In section 3 of the Final Office Action, the Examiner also stated:

The after final amendment presented 9/8/2009 **was not entered** and applicant has presented new claim amendments with the RCE. If these new claim amendments were presented in the after final amendment, the amendment would have been entered after final, and the finality of the rejection of the claims would have been maintained because the prior art discloses this amended feature as stated in the previous office actions.

(Underlining and bolding added). Applicants respectfully disagree with all of the Examiner's statements. First, the amendments presented in the after final amendment amended the dependent claims to include a feature taken directly from a dependent claim which was canceled and did not introduce new subject matter or raise new issues that would require further consideration and/or search. Therefore, the failure to enter these amendments was improper. Second, Applicants chose to amend the claims to introduce an element that was not previously included in the claims and filed an RCE to require entry of this amendment. This amendment **should have** required further consideration and/or search yet the Examiner asserts that **these** amendments would have been entered. Third, the Examiner asserts that the "claims are drawn to the same invention claimed in the application prior to the entry of the submission" despite the fact that the Examiner has never considered the claim element "selecting a signal constellation, at a communication device, based on a channel estimation

error” as recited in amended Claim 26. Therefore, Applicants submit that the finality of the rejection is wholly improper and request withdrawal of the finality of the rejection.

II. Rejection of Claims 26, 27, 30, 31, 35, 36, 39, 40, 44-49, and 51-53 Under 35 U.S.C. § 102

In section 6 of the Final Office Action, Claims 26, 27, 30, 31, 35, 36, 39, 40, 44-49, and 51-53 were rejected under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent No. 6,560,445 to Fette *et al.* (*Fette*). Applicants disagree and submit that *Fette* fails to teach, suggest, or disclose all of the elements of at least independent Claims 26, 35, 46, 47, 49, 51, and 53.

Claim 26 recites in part “selecting a signal constellation, at a communication device, based on a channel estimation error.” Claims 35, 46, 47, 49, 51, and 53, though of different scope, recite a similar feature.

On pages 4-5 of the Final Office Action, the Examiner states:

The signal to noise ratio (SNR) of each coefficient is used to determine the constellation that will be used for transmission (column 8, lines 20-51). The SNR is an estimation of the quality of the channel used for communication. The channel quality is a channel estimation and errors in the channel quality (a reduced level of channel quality) represent channel estimation errors. The level of the signal is determined as is the level of the noise present in the channel to determine a signal-to-noise-ratio (SNR). The noise or distortion present in the communication channel is a channel estimation error since the noise or distortion represents errors in the channel. When little or no distortion is detected, the error is minimized and the signal is transmitted with minimal interference.

(Underlining added). First, Applicants fail to follow the Examiner’s logic as to how the SNR can be related to “a channel estimation error,” which it cannot. Even if the relationships drawn by the Examiner were true, which Applicants do not concede, the Examiner’s logic does not arrive at a relationship that equates the SNR to “a channel estimation error.” The Examiner’s logic results in SNR->channel quality->channel estimation and errors->channel estimation errors. Thus, the Examiner comes to the unremarkable conclusion that errors represent errors, but fails to indicate a basis for equating the SNR to “a channel estimation error.”

Second, Applicants further respectfully disagree with the Examiner's statement that "noise or distortion present in the communication channel is a channel estimation error since the noise or distortion represents errors in the channel." Noise and distortion are two different signal parameters, and noise does not represent *errors* in the channel. Noise effects the ability to detect the signal, and is not itself "a channel estimation error."

At column 8, lines 20-51, cited by the Examiner, *Fette* states:

In the simulation, all cepstral coefficients are modulated with random noise, ranging over the values -1 to +1. This may be performed one coefficient at a time or in multiples of coefficients or even all coefficients, each with independent noise. The simulation of many baud of communication is performed (assume at least 10 times the number of bits to be delivered under these conditions). The receive simulation decodes and recovers the cepstral coefficients, which can now be correlated with those coefficients transmitted. This correlation now provides evidence of the signal to noise ratio (SNR) of each cepstral coefficient and its ability to convey information. This process will also produce a model of how the various forms of interference degrade or offset the cepstral coefficients. Also, certain types of interference may be detected and eliminated by recognizing that a certain cepstral coefficient was always modulated to be zero and that, by receiving as non-zero, the location of interference may be recovered in the spectrum and its artifact removed.

Modulation constellations for cepstrum can be one-dimensional (scalar) as shown in FIG. 7, two-dimensional (as is done in quadrature modulation) and as is shown in FIG. 8, three-dimensional as shown in FIG. 9, or higher. In principle, for very high SNR situations, all dimensions of cepstrum could be modulated with a very high dimensionality table. If we choose to create two or three-dimensional modulation constellations for cepstral coefficients, we can also choose which coefficients to cluster together in sets of two or three. They need not be consecutive. As in prior systems, the ability of a signal to deliver Boolean information is a function of the signal to noise ratio of the communications channel.

(Underlining added). Thus, contrary to the Examiner's statement, the cited section of *Fette* teaches nothing whatsoever related to "selecting a signal constellation, at a communication device, based on a channel estimation error" as recited in independent Claim 26, and similarly recited in Claims 35, 46, 47, 49, 51, and 53. To the contrary, according to *Fette*, the constellation is selected by identifying a SNR in the created "table or set of tables" (col. 9, ll.

46-47) that is closest to the actual received SNR. The SNR is not a channel estimation error. The SNR is a measure of the signal power to the noise power, neither of which is an error. Therefore, *Fette* fails to provide any teaching of at least “selecting a signal constellation, at a communication device, based on a channel estimation error” as recited in independent Claim 26, and similarly recited in Claims 35, 46, 47, 49, 51, and 53.

Applicants also respectfully point out that Claims 27, 36, and 52 recite “wherein the signal constellation is further selected based on a signal to noise ratio.” Thus, based on claim differentiation, “a channel estimation error” is distinguishable from “a signal to noise ratio” or Claims 27, 36, and 52 would not narrow Claims 26, 35 and 51, respectively.

For at least these reasons, Applicants respectfully submit that *Fette* fails to teach, suggest, or describe all of the elements recited in at least independent Claims 26, 35, 46, 47, 49, 51, and 53. A rejection under 35 U.S.C. § 102 cannot be properly maintained where the reference fails to teach each and every element of the rejected claims. The remaining claims depend from one of Claims 26, 35, 47, or 51. Thus, for at least this reason, Applicants respectfully request withdrawal of the rejection of Claims 26, 30, 35, 36, 39, 40, 44-49, and 51-53.

III. Rejection of Claims 28, 29, 37, and 38 Under 35 U.S.C. § 103(a)

In section 7 of the Final Office Action, Claims 28, 29, 37, and 38 were rejected under 35 U.S.C. § 103(a) as being unpatentable over *Fette* in view of U.S. Patent Publication No. 2002/0090035 to Seshadri *et al.* (*Seshadri*). Applicants respectfully disagree because *Fette* and *Seshadri*, alone and in combination, fail to teach, suggest, or disclose all of the elements of at least independent Claims 26 and 35 from which Claims 28, 29, 37, and 38 depend.

As discussed in Section II. above, *Fette* fails to teach, suggest, or disclose all of the elements of at least independent Claims 26 and 35. *Seshadri* fails to remedy the deficiencies of *Fette*.

Seshadri describes a method “used to generate set partitioning structures and trellis structures that enable code designers to systematically design the codes of the invention.” (Abstract). *Seshadri* states:

Once the rate has been selected, other aspects of the communications system and code are fixed. For example, a rate of 1 bit/second/hertz means that the system will have a

constellation size of 2 (a BPSK system). A rate of 2 bits/second/hertz means the system will have a constellation size of 4 (a QPSK system). A rate of 3 bits/second/hertz means that the system will have a constellation size of 8 (an 8-PSK system). In general, the constellation size (L) will equal $2^{\text{sup.}b}$, where b represents the selected rate. Also, as described herein, once the rate is selected, the number of input bits provided to lookup table 506 is 2b. Thus, selecting a rate is an important design consideration.

(Para. [0083]; underlining added). Thus, according to *Seshadri*, the constellation can be selected based on a rate where the “selected rate represents the number of bits transmitted in a given period of time.” (Para. [0082]). However, *Seshadri* fails to provide any teaching of at least “selecting a signal constellation, at a communication device, based on a channel estimation error” as recited in independent Claim 26, and similarly recited in Claim 35.

Thus, *Fette* and *Seshadri*, alone and in combination, fail to teach, suggest, or disclose all of the elements of at least independent Claims 26 and 35. An obviousness rejection cannot be maintained when the combination of references cited fails to teach each and every element recited in the claims. As a result, Applicants respectfully request withdrawal of the rejection of Claims 28, 29, 37, and 38, which depend from Claims 26 and 35.

IV. Rejection of Claims 32, 41, and 50 Under 35 U.S.C. § 103(a)

In section 8 of the Final Office Action, Claims 32, 41, and 50 were rejected under 35 U.S.C. § 103(a) as being unpatentable over *Fette* in view of *Dabak et al.*, “Signal Constellations for Non-Gaussian Communication Problems”, Proceedings of the 1993 IEEE International Conference on Acoustics, Speech, and Signal Processing, April 27-30, 1993, Minneapolis, Minnesota, 33-36 (*Dabak*). Applicants respectfully disagree because *Fette* and *Dabak*, alone and in combination, fail to teach, suggest, or disclose all of the elements of at least independent Claims 26, 35, and 49, from which Claims 32, 41, and 50 depend, respectively.

As discussed in Section II. above, *Fette* fails to teach, suggest, or disclose all of the elements of independent Claims 26, 35, and 49. *Dabak* fails to remedy the deficiencies of *Fette*.

Dabak describes a “procedure for determining optimum signal sets.” (Abstract). *Dabak* states that “[o]ptimum signal constellations depend on signal-to-noise ratio.”

(Abstract). *Dabak* further states that “[f]or small M , we can calculate optimal signal sets by maximizing the sum of all intersignal distance measures under a signal-related constraint.” (Page 34, Section 3). However, *Dabak* fails to provide any teaching of at least “selecting a signal constellation, at a communication device, based on a channel estimation error” as recited in independent Claim 26, and similarly recited in Claims 35 and 49.

Thus, *Fette* and *Dabak*, alone and in combination, fail to teach, suggest, or disclose all of the elements of at least independent Claims 26, 35, and 49. An obviousness rejection cannot be maintained when the combination of references cited fails to teach each and every element recited in the claims. As a result, Applicants respectfully request withdrawal of the rejection of Claims 32, 41, and 50, which depend from Claims 26, 35, and 49.

V. Rejection of Claims 33, 34, 42, and 43 Under 35 U.S.C. § 103(a)

In section 9 of the Final Office Action, Claims 33, 34, 42, and 43 were rejected under 35 U.S.C. § 103(a) as being unpatentable over *Fette* in view of U.S. Patent No. 6,674,820 to Hui *et al.* (*Hui*). Applicants respectfully disagree because *Fette* and *Hui*, alone and in combination, fail to teach, suggest, or disclose all of the elements of at least independent Claims 26 and 35 from which Claims 33, 34, 42, and 43 depend.

As discussed in Section II. above, *Fette* fails to teach, suggest, or disclose all of the elements of independent Claims 26 and 35. *Hui* fails to remedy the deficiencies of *Fette*.

Hui describes a method “in which, over each synchronization signal period or other determinate information window, the channel coefficients and the color of the baseband noise are concurrently estimated.” (Abstract). *Hui* states:

To extract the transmitted signal (or symbols) from the received signal, the receiver of a mobile terminal typically includes a demodulator which may be a coherent demodulator such as a maximum likelihood sequence estimation (MLSE) demodulator (or equalizer). To adapt to the channel variation from each data burst to the next, an associated channel estimator is typically provided for the demodulator. The channel estimator typically operates using known transmitted symbols.

(Col. 1, ll. 57-65). However, *Hui* fails to provide any teaching of at least “selecting a signal constellation, at a communication device, based on a channel estimation error” as recited in independent Claim 26, and similarly recited in Claim 35.

Thus, *Fette* and *Hui*, alone and in combination, fail to teach, suggest, or disclose all of the elements of at least independent Claims 26 and 35. An obviousness rejection cannot be maintained when the combination of references cited fails to teach each and every element recited in the claims. As a result, Applicants respectfully request withdrawal of the rejection of Claims 33, 34, 42, and 43, which depend from Claims 26 and 35.

VI. Double Patenting Rejection

In section 10 of the Final Office Action, Claims 26, 27, 30-32, 35, 36, 39-41, and 45-53 were provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over Claims 41, 42, 45, 49, 50, and 57-58 of U.S. Patent Application No. 10/671,346. Applicants respectfully request that the double patenting rejection be held in abeyance until the pending claims are otherwise determined to be in condition for allowance. If the claims are otherwise found to be in condition for allowance, Applicants will review the claims at that time and determine whether a terminal disclaimer is appropriate.

Applicants believe that the present application is in condition for allowance. Favorable reconsideration of the application is respectfully requested.

The Examiner is invited to contact the undersigned by telephone if it is felt that a telephone interview would advance the prosecution of the present application.


The Commissioner is hereby authorized to charge any additional fees which may be required regarding this application under 37 C.F.R. §§ 1.16-1.17, or credit any overpayment, to Deposit Account No. 19-0741. Should no proper payment be enclosed herewith, as by the credit card payment instructions in EFS-Web being incorrect or absent, resulting in a rejected or incorrect credit card transaction, the Commissioner is authorized to charge the unpaid amount to Deposit Account No. 19-0741. If any extensions of time are needed for timely acceptance of papers submitted herewith, Applicants hereby petition for such extension under

37 C.F.R. §1.136 and authorizes payment of any such extensions fees to Deposit Account No. 19-0741.

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Respectfully submitted,

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